Improved technologies for mitigating post-harvest food loss

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Challenges & Study objective

- ✓ High postharvest (PH) losses leading to low farm productivity, inefficient use of resources, less food and loss of income.
- ✓ Poor market quality of produce resulting in to low market prices.
- ✓ Drudgery in processing resulting in PH loss and low productivity.
- ✓ Less nutritious and safe food.

Main objective:

To study effects of improved PH handling and storage techniques on reduction of food losses, and improvement of farmer conditions.

Introduced technologies

(i) Collapsible Drier Case (CDC) for quicker/protected grain drying
(ii) Mechanized maize shelling (MS) for drudgery reduction
(iii) Hermetic bags (HS) for storage losses reduction

Evidence

- CDC improved grain quality by 30 – 44%, and reduced drying losses by 63% from 67.3kg/ton to 24.7kg/ton.
- MS reduced cost of labour by 77%, resulted in labour efficiency gain of 88%, improved grain quality by 55% and reduced grain shelling and cleaning losses by 70% from ~68 to <20 kg/ ton.
- HS reduced storage losses by at least 85% (from 150 – 250kg/ton to 22 – 40kg/ton), increased availability of food among net-buyer households by 38%, and reduced their annual grain deficit by 17%.

Table 1. Improvements in the various sustainable intensification domains

		Productivity	Environment	Economics	Human
		Reduction in harvest losses*	Agric. land (ha) saved	Value ($/ha) of food saved	Additional food (kg/ha) for HH
% change	CDC	15 - 22%	5-6%	2 - 5%	2 – 5%
	MS	19 -24%	6-8%	3 - 7%	3 - 7%
	HS	55 - 65%	8-17%	50 – 67	16 - 29%
	CDC + MS	28 - 32%	8-11%	12 - 36%	5 - 12%
	HS + MS	69 - 76%	19-28%	54 - 80%	19 - 40%
	CDC + MS + HS	79 - 84%	21-32%	58 - 88%	22 - 45%

*The overall quantity losses magnitude along the entire chain without any intervention was 250– 400kg/ton

Fig 1. Improved technologies for grain processing, handling and storage

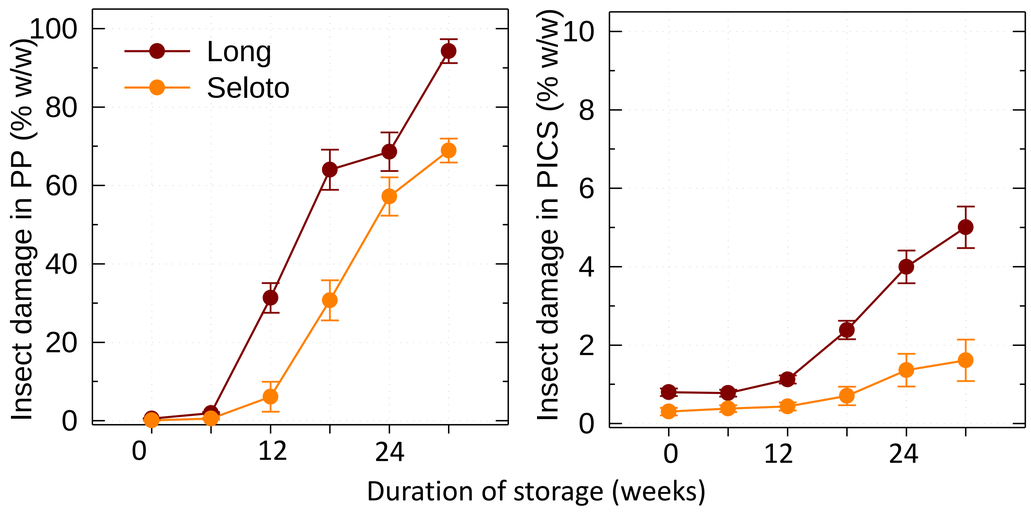

Fig 2. Insect damage of stored maize in two agro-ecologically different locations: Long ≈ high altitude; Seloto ≈ mid-altitude; PP: woven polypropylene bag (control).

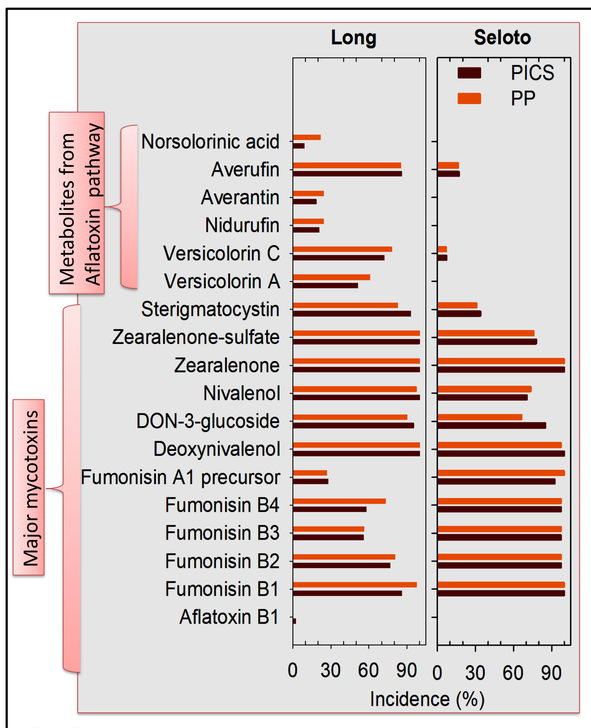

Fig 3. Mycotoxin incidence on stored maize in two agro-ecologically different locations.

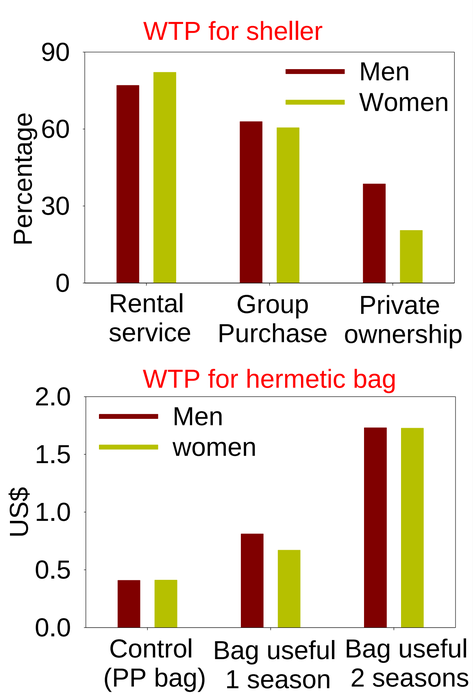

Fig 4. Farmer willingness to pay for technologies.

Approaches of taking the technologies to scale

- Since 2014, over 15, 000 farmers and 4,000 HH reached directly in Tanzania through Africa RISING- NAFAKA/ TUBOCHA program.
- Approach has been training lead farmers and extension officers linking them to input suppliers, and partnering with local institutions in research and training activities.

Proposals for the future

Research

- Generate more evidence on nutritional, quality and safety improvements, and impacts on environmental, economic and social conditions;
- Integrate research on postharvest mechanization.

Scaling

- Since July 2018 commenced a strategic arrangement with Islands of Peace to undertake backstopping research while building PH capacity of the development partner to reach > 4000 HH by 2021. Similar arrangement to be done with others e. g. CRS.

Partners

We thank farmers and local partners in Africa RISING sites for their contributions to this work. We also acknowledge the support of all donors which globally support the work of the CGIAR centers and their partners through their contributions to the CGIAR system